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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/614,516	07/08/2003	Christophe Bureau	239939US0CONT	1358
22850 7590 03/28/2007 OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			EXAMINER LUNDGREN, JEFFREY S	
			ART UNIT	PAPER NUMBER
			1639	
SHORTENED STATUTORY PERIOD OF RESPONSE		NOTIFICATION DATE	DELIVERY MODE	
3 MONTHS		03/28/2007	ELECTRONIC	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 03/28/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentdocket@oblon.com  
oblonpat@oblon.com  
jgardner@oblon.com

<b>Office Action Summary</b>	Application No. 10/614,516	Applicant(s) BUREAU ET AL	
	Examiner Jeff Lundgren	Art Unit 1639	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-17 and 20-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4-17 and 20-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Status of the Claims***

Claims 1, 2, 4-17 and 20-24 are pending in the instant application, and are the subject of the Office Action below.

### ***Objection to the Drawings***

The objection to the drawings is withdrawn in view of Applicants' amended drawings.

### ***Objection to the Description***

The objection to the disclosure because Scheme 2 on page 22 was not labeled is overcome by Applicants' amendment to the specification. Appropriate correction is required.

### ***Claim Objections***

The objections to the claims are overcome by Applicants' amendments.

### ***Withdrawn Rejections***

Any rejections not reiterated in the instant Office Action, are withdrawn.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. § 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 12-17 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 12-17 are indefinite for reciting the phrase "said organic molecules include at least one of electrograftable molecules" because it is not clear how this term further limits claim 1. Specifically, since the organic molecules are electrochemically grafted in claim 1, it follows that the organic molecules must be "electrograftable."

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Claims 12-17 are indefinite for reciting the phrase "said organic molecules include at least one of electrograftable molecules" because it is not clear how a molecule "includes" another molecule. If Applicants wish to use Markush language, the phrase "selected from the group consisting of" is recommended.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The rejection of claims 1, 2, 4, 7-9, 12, 14-17, 19, 20- 24, under 35 U.S.C. § 102(b) as being anticipated by Charlier *et al.*, *Journal of Electroanalytical Chemistry* 465:200-208 (1999), is maintained.

Claim 1 is directed to a process for mask-free localized grafting of organic molecules, which are capable of being electrically activated, onto a composite surface comprising conductive and/or semiconductive portions, by the process comprising placing said organic molecules in contact with said composite surface, in which said grafting is performed and electrochemically in a single step grafting an insulating film of said organic molecules on chosen, defined areas of said conductive and/or semiconductive portions by bringing said areas being brought to a potential higher than or equal to a threshold electrical potential~ which is determined relative to a reference electrode, ~aid threshold electrical potential being the potential and above which grafting of said organic molecules takes place.

Charlier teaches a process for: electrografting organic molecules onto a composite surface (i.e., quartz, titanium and platinum; see Experimental on pages 201-202), wherein the organic molecules are insulating, and the electrografting occurs on a defined area (i.e., the electrode), and occurs at the threshold potential.

The composite materials have a different work function (i.e., see ECQM– see Experimental) as in claim 2; the composite surface comprises silicon (the EQCM), as in

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claim 5; consists of two different metals (Pt and Ti), as in claims 7 and 8; the thickness of the metals in on the nanoscale, as in claim 9; the organic molecules are electrograftable and electrocleavable (see Figure 2 and description thereof); the electrograftable NVP and MAN meet the limitations of claims 12 and 14-17; the organic molecules meet the limitations of claims 19 and 20, and as in claim 21 by using MAN; and meets the limitations of claim 23 (see Figure 3A and description thereof). Applicants acknowledge that this is a known practice to those of ordinary skill in the art (see paragraph 0138).

### *New Grounds of Rejection*

Claims 1, 2, 7, 14, are rejected under 35 U.S.C. § 102(b) as being anticipated by Boissel *et al.*, U.S. Patent No. 5,350,323, issued on September 27, 1994.

Claim 1 is directed to a process for mask-free localized grafting of organic molecules, which are capable of being electrically activated, onto a composite surface comprising conductive and/or semiconductive portions, by the process comprising placing said organic molecules in contact with said composite surface, in which said grafting is performed and electrochemically in a single step grafting an insulating film of said organic molecules on chosen, defined areas of said conductive and/or semiconductive portions by bringing said areas being brought to a potential higher than or equal to a threshold electrical potential which is determined relative to a reference electrode, a threshold electrical potential being the potential and above which grafting of said organic molecules takes place.

Boissel teaches a contact for an electrical connector usable in numerous fields such as data processing, aeronautics, telecommunications and devices implanted in the human body, wherein the contact is formed by electropolymerization of a monomer such as acrylonitrile, followed by a heat treatment or irradiation to improve its electrical conductivity, so that a contact resistance not exceeding 10 ohms is obtained. The organic polymers which can be used are those which can be transformed into polymers having a cyclic and/or unsaturated structure by a heat treatment or by irradiation. Examples of such polymers are polyacrylonitrile, polyvinyl pyrridine and polypentafluorostyrene.

Boissel teaches the use of gold electrodes:

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“More specifically, it relates to the protection of contacts of such connectors against corrosion. In general, the contacts of electrical connectors are made from precious metals such as gold, which has the requisite qualities for obtaining a low electrical contact resistance, a good friction and a good corrosion behaviour. The gold is generally deposited on a nickel underlayer, which serves as a diffusion barrier. However, the cost of gold seriously increases prices.”

Boissel, col. 1, lines 12-22. Also see Example 2.

This example illustrates the use of a protective coating having a nickel underlayer and a polyacrylonitrile film subject to heat treatment. In this example the contact surface to be coated is a brass surface, on which is firstly deposited by electrolysis a 2 micron thick nickel underlayer. Then, by electropolymerization on the nickel underlayer, is formed a 30 nm thick polyacrylonitrile film (see Example 1).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims are 1, 2, 4-17 and 20-24, rejected under 35 U.S.C. § 103(a) as being unpatentable over Yano *et al.*, U.S. Patent No. 4,269,682, issued on May 26, 1981, in view of Boissel *et al.*, U.S. Patent No. 5,350,323, issued on September 27, 1994.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. § 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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Claim 1 is directed to a process for mask-free localized grafting of organic molecules, which are capable of being electrically activated, onto a composite surface comprising conductive and/or semiconductive portions, by the process comprising placing said organic molecules in contact with said composite surface, in which said grafting is performed and electrochemically in a single step grafting an insulating film of said organic molecules on chosen, defined areas of said conductive and/or semiconductive portions by bringing said areas being brought to a potential higher than or equal to a threshold electrical potential which is determined relative to a reference electrode, a threshold electrical potential being the potential and above which grafting of said organic molecules takes place.

Yano teaches a reference electrode of an insulated gate field effect transistor having the surface of the gate region thereof coated with a hydrophobic organic polymer membrane. Since this reference electrode is much smaller in size than conventional reference electrodes, an integrated measurement system can easily be constructed by using this reference electrode. This measurement system is especially effective for measuring various ions in the living body. Yano teaches the advantages of protected electrodes for these uses:

*"In order to improve the chemical resistance and mechanical strength in the resulting membrane, it is preferred that at the step of applying such polysiloxane to the gate surface, a cross-linking agent such as an alkoxysilane, a hydroxysilane, an oxime silane or an acetoxysilane is incorporated into the polysiloxane and the cross-linking treatment is carried out after the coating step."*

In addition, monomers capable of forming hydrophobic polymers, such as styrene, divinylbenzene, *acrylonitrile*, acrolein, vinyl acetate, *methyl methacrylate*, butyl acrylate, vinylidene cyanide, chlorostyrene and chloromethylstyrene may be used as the starting compound for formation of a hydrophobic polymeric membrane in this invention."

Yano, col. 6, lines 6-21. Yano further teaches gold/silicon electrodes for the measurement purposes (col. 9, lines 30-64). Regarding the silver dopant of claim 22, Applicants acknowledge that this is a known practice to those of ordinary skill in the art (see paragraph 0138).

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Although Yano teaches certain of the claimed polymer-coated electrodes, Yano does not explicitly suggest that the polymerization be carried out by electrografting.

Boissel teaches a contact for an electrical connector usable in numerous fields such as data processing, aeronautics, telecommunications and devices implanted in the human body, wherein the contact is formed by electropolymerization of a monomer such as acrylonitrile, followed by a heat treatment or irradiation to improve its electrical conductivity, so that a contact resistance not exceeding 10 ohms is obtained. The organic polymers which can be used are those which can be transformed into polymers having a cyclic and/or unsaturated structure by a heat treatment or by irradiation.

One of ordinary skill in the art would have had a reasonable expectation of success in arriving at the invention as claimed because each of Yano and Boissel are directed to acrylonitrile coated electrodes for tailored performance as biological implants. One of ordinary skill would have been motivated by the improved chemistries of Boissel for forming resistant polymer membranes that protect the metal electrode over the crosslinking approach of Yano. Accordingly, the invention as a whole is *prima facie* obvious at the time it was invented.

### ***Conclusions***

No claim is allowable.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

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extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

If Applicants should amend the claims, a complete and responsive reply will clearly identify where support can be found in the disclosure for each amendment. Applicants should point to the page and line numbers of the application corresponding to each amendment, and provide any statements that might help to identify support for the claimed invention (*e.g.*, if the amendment is not supported *in ipso verbis*, clarification on the record may be helpful). Should Applicants present new claims, Applicants should clearly identify where support can be found in the disclosure.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Jeff Lundgren whose telephone number is 571-272-5541. The Examiner can normally be reached from 7:00 AM to 5:30 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, James Schultz, can be reached on 571-272-0763. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JSL

JON EPPERSON  
PRIMARY EXAMINER

A handwritten signature in black ink, appearing to be 'J. Epperson', written over the printed name.